

## Reply for Office Action Summary

Application No.10/535,438

Office Action Summary: USPTO Confirmation No. 6160, Date Mailed: 12/15/2005

### A. For Claim Rejection - 35 USC § 112

#### Statement of Examiner of USPTO:

The following is a quotation of the second paragraph of U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 2 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 1, it is indefinite and unclear to state the method of determining the ratios between the distance length of bearings of machines and apparatus and the ratios of the distance length of arbitrarily chosen two correction planes without the test runs.

With respect to claim 2, it is indefinite and unclear to state the computers, measuring instruments and testing facilities, which are directly or indirectly applied or equipped.

#### Reply-1 of Applicant:

With respect to claim 1, according to the statement, this applicant would like to correct the claim 1 as following:

"1. The calculating method to determine the dynamic unbalance in rotor of rotating machine by the geometric or complex number vector calculation, which is using with the ratios between the distance lengths of two bearings of machine and the ratios of the distance length of two correction planes chosen arbitrarily, based on the data consist of magnitudes and directions for vibration vector quantities of displacement, velocity, or acceleration which data originated in dynamic unbalance in rotor of machine, which data are measured at the two bearings of the rotating machine without the test runs attached with trial masses, and which data are defined as the dynamic unbalance on two journal-planes of the rotor of rotating machine. "

This applicant is understanding that the methods of determining these ratios for the distance lengths will be naturally defined according to the theorem of statics and dynamics of mechanical balancing engineering; e.g. Timoshenko and Young, "Engineering Mechanics" 4th edition, Appendix 4., especially for "arbitrarily chosen correction planes", if necessary.

Additionally, in this application, this applicant is using the technical terms cited from followings; e.g. dynamic unbalance, balancing machine, specific unbalance, field balancing :

ISO 1925: "Mechanical vibration-Balancing-Vocabulary", 1990.

JIS B 0905-1992: "Rotating machines-Balance quality requirements of rigid rotors",

S.Timoshenko, "Vibration problems in engineering", 2nd edition 1937, p.62-68.

#### Reply-2 of Applicant:

With respect to claim 2, this applicant is understanding that the calculation method of this invention is possible to apply to any computers, measuring instruments and testing

facilities, which are directly or indirectly applied or equipped, so it is not necessary to define to the particular items to be applied.

### **B. For Claim Rejection - 35 USC § 101**

#### **Statement of Examiner of USPTO:**

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 1 and 2 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

With respect to claim 1 and 2, the method does not produce a tangible result. It is unclear how the process is achieved and whether the result is being stored, displayed, or used in any tangible manner.

#### **Reply-3 of Applicant:**

With respect to claim 1 and 2, this applicant is understanding that on the prior arts, the geometric vector calculation method of this invention has not been used to determine the dynamic unbalance in rotors of rotating machines as following examples :

1. The soft bearing type balancing machines are based on a electrical network method;  
e.g. J. G. Baker, & F.C. Rushing, "Balancing Rotors by means of Electrical Network",  
The Journal of the Franklin Institute, Vol. 222, P.183~196, 1936.
2. The hard bearing type balancing machines are based on Nodal-network of equilibrium equation.  
e.g. R. Hiramatu et. al., "Simadzu-HOFMANN Dynamaic Balancing Machine of New  
Measuring System", Shimadzu Review, Vol. 26, No.1(1969)
3. Field balancing methods are based on a influence coefficient method that the plural test runs attached with trial masses are needed ;  
e.g. N. O. Myklestad, "Fundamentals of Vibration Analysis", 1956, McGraw-Hill,

And for the present claim 1 will be corrected and revised as above Reply-1.

For the present claim 2, please refer above Reply-2.

### **C. For Claim Rejection - 35 USC § 102**

#### **Statement of Examiner of USPTO:**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Graves et al.

(US 5,689,543).

With respect to claim 1, Graves discloses the calculating method to determine the dynamic unbalance in rotors by the vector calculation which is using with the ratios between the distance lengths of bearings (26) of machines (10) and apparatus (Column 3, lines 55-61)

and the ratios of the distance length of arbitrarily chosen two correction planes (28 and 30) without the test runs attached with trial masses, based on the data consist of magnitudes and directions for the vibration vector quantities of displacement (Column 4, lines 25-34), velocity, or acceleration (Column 4, lines 33, 49 and 52) which originated in dynamic unbalance in rotor, and which are measured at the two bearings (26) of rotating machines (10) or dynamic balancing machines (10).

With respect to claim 2, Graves discloses the computers, measuring instruments and testing facilities, which are directly or indirectly applied or equipped the calculating method to determine the dynamic unbalance in rotor with vector calculation (10).

**Reply-4 of Applicant:**

This applicant thinks that these Claims 1 and 2 are not anticipated by Graves et al. (US 5,689,543), because that this applicant confirmed as follows:

With respect to the statement of claim 1:

In Column 3, lines 55-61, Graves discloses the preferable space of correction planes of X-ray anode-rotor (10), did not disclose the calculating method to determine the dynamic unbalance in rotors by the vector calculation.

In Column 4, lines 25-34, Graves discloses the it may be preferable to balance the assembled anode (10) at a lower speed than that at which the rotor (12) alone was balanced. And Graves discloses the other preferable speed to balance.

In Column 4, lines 33, 49 and 52, Graves discloses the balancing speeds for the over all anode (10), particularly at speeds above the first critical speed and greater degree and wider range of operating speed.

Graves discloses also that the locations of the correction planes and the testing speeds of balancing of X-ray anode rotor are claimed in Column 4-end, 5 and 6.

The other hand, Graves discloses that the dynamic unbalance parameters may be determined by any known dynamic balance apparatus, e.g. the Schenck Trebel Model H1/10B hard bearing balancing machine (Schenck Trebel Corp., Deer Park, N.Y., USA). (ref. Column 3, lines 40-50), .Thus, this applicant understands that Graves has not been disclosed the any calculating method to determine the dynamic unbalance in rotors by the vector calculation in US 5,689,543.

**Reply-5 of Applicant:**

With respect to claim 2, Graves does not disclosed the computers, measuring instruments and testing facilities, which are directly or indirectly applied or equipped the calculating method to determine the dynamic unbalance in rotor with vector calculation .

For "The vector calculation (10)" stated by the examiner in Page 4 of Office Action Summary , the part showed by (10) means "anode" in Graves's detailed description, not any calculation..

**D. For Conclusion**

**Statement of Examiner of USPTO:**

The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Schonfeld (US 4,891,981), Gasch et al. (US 5,406,846), and Lyman et al. (US 3,952,602).

**Reply-6 of Applicant:**

This applicant confirmed and understood as followings:

1. **Schonfeld** (US 4,891,981) discloses the method for determining the position and magnitude of correction to achieve minimal static residual unbalance (Column 1, line 49-54), the fully unbalances U1 and U2 are measured by the 5-Unbalance Measuring Unit (Column 3, line 56-61, Fig.6). The purpose of vector calculations showed on Fig.2, 3, 4, 5, 7, 8, and 9 are to be performed to achieve minimal static residual unbalance in correction planes and not be used to determine U1 and U2.

However, this applicant's vector calculation method will be possible to apply to the 5-Unbalance Measuring Unit determining U1 and U2.

2. **Gasch et al.** (US 5,406,846) disclose the process determining the unbalance of a driven rotating rigid rotor by mean of the segment of rotation and the dynamic effect due to acceleration and others, but don't disclose for the purpose or function of control program 30 and evaluation unit 5 (Column 3, line 48), and any calculation method for dynamic unbalance in rotor.

However, this applicant's vector calculation method will be possible to apply to the evaluation unit 5.

3. **Lyman et al.** (US 3,952,602) disclose the rotor balancing apparatus and system comprising photocell probes for measuring unbalance at the end of a magnetically suspended rotor, but don't disclose any calculation method for dynamic unbalance in rotor.

However, this applicant's vector calculation method will be possible to apply to the patent.

**E. For Drawings****Statement of Draftsperson of USPTO**

The drawings filed (insert date) 05/10/2005 are objected to by the Draftsperson under 37CFR 1.84 or 1.152 for the reasons indicated below. Corrected drawings are required.:

Numbers, letters and reference characters must be at least .32 cm (1/8 inch) in height. 37CFR 1.84(p) (3). Fig(s) 1- 4.

**Reply-7 of Applicant:**

Accordingly, this applicant would like to correct the drawings: Fig(s) 1- 4., in accordance with 37CFR 1.84(p) (3).

**Summary of Applicant's replies:**

This applicant will send the corrected page 8 (Claims) and page 9 - 10 (Fig. 1-4) to USPTO within this February.

Date/ Place: Tokyo/ Feb.16, 2006

Applicant / Inventor

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